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| EXAMINER | |
|---|---|
| BERNS, DANIEL J | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1734 | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/535,066 | RYTTER ET AL. | |
| | Examiner | Art Unit | |
| | DANIEL BERNS | 1734 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *13 October 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-5,8-16 and 18-57* is/are pending in the application.

4a) Of the above claim(s) *19-57* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5, 8-16 and 18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in Graham v. John Deere Co., 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. In considering the obviousness rejections below, the applicant should note that the person having ordinary skill in the art has the capability of understanding the scientific and engineering principles applicable to the claimed invention. The references of record in the application reasonably reflect this level of skill.

5. Claims 1-5, 8, 9, 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gardner et al., US 4,888,316 (1989) ("Gardner"). Regarding claim 1, Gardner teaches a (reconditioned) catalyst suitable for such processes as Fischer-Tropsch (“F-T”) syntheses (see

Gardner at col. 5, ln. 48-60), comprising Co on $Al_2O_3$, wherein the impregnated and calcined catalyst possesses certain values as claimed: a 50-300 $m^2/g$ surface area (100-200 $m^2/g$ being preferred), an average pore size of ~50-500 Å (~100-300 Å being preferred), a pore volume of ~0.5-1.5 cc/g (~0.8-1.2 cc/g being preferred), and a Co content of ~0.5-10 % by weight metal. See id. at col. 5, ln. 13-35. See id. at col. 3, ln. 7-13 and col. 5, ln. 39-44. See, e.g., In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976) (holding that a prima facie case of obviousness exists where claimed ranges "overlap or lie inside ranges disclosed by the prior art"); MPEP § 2144.05. Gardner further teaches fresh, similar catalyst for such reactions, see id. at col. 2, ln. 47 to col. 3, ln. 21, but it is unclear whether the fresh catalyst has been calcined.

The difference between claim 1 and Gardner is that the latter does not explicitly teach an average catalyst particle size within the claimed range. Gardner does teach the grinding of spent catalyst to ~40-250 mesh (~425-58 μm), implying that an appropriate fresh particle's size is either approximately that size or smaller, since the catalyst acquires impurities (e.g., 'coke,' etc.) and is thus enlarged during the fouling/use process. See id. at col. 2, ln. 47-56 and col. 4, ln. 1-4.

Given the foregoing, and the well-known fact in the art that a catalyst's reactivity (such as Gardner's) is inversely proportional to its particle size (it is well-known that smaller particles show higher surface areas and thus also higher reactivities)[1], it would have been obvious to one of ordinary skill in the art at the time the invention was made to ascertain and achieve an appropriate particle size (i.e. within the claimed range), for Gardner's catalyst via routine experimentation. See In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) (holding

[1] Examiner's determination that the reactivity/size/surface area relationships are well-known in the art, despite being absent from the cited documentation, is buttressed by the Federal Circuit's statement that "[a] patent need not teach, and preferably omits, what is well known in the art." See In re Buchner, 929 F.2d 660, 661, 18 USPQ2d 1331, 1332 (Fed. Cir. 1991); MPEP 2164.01.

that "where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation"); MPEP 2144.05.

Regarding claim 2, Gardner teaches a preferred surface area of 100-200 $m^2/g$, within the claimed range. See id. at col. 5, ln. 26-29.

Regarding claim 3, as above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to ascertain and achieve an appropriate particle size, such as within the claimed range, for Gardner's catalyst via routine experimentation. In re Aller; MPEP 2144.05.

Regarding claims 4 and 5, Gardner teaches a preferred pore size of ~100-300 Å, within the claimed ranges. See Gardner at col. 5, ln. 26-33.

Regarding claim 8, Gardner teaches the presence of a promoter material in both its fresh (see id. at col. 3, ln. 7-13) and reconditioned (see id. at col. 5, ln. 39-44) catalysts. A weight % as claimed is at least suggested thereby. See id. at col. 3, ln. 7-13 and col. 5, ln. 39-44. In re Wertheim; MPEP § 2144.05.

Regarding claim 9, Gardner at least suggests employing Re as a promoter. See id. at col. 3, ln. 17-21. It may reasonably be presumed that such a promoter would be appropriate within the weight % ranges taught by Gardner immediately prior to Re, within and/or overlapping the claimed range. See id. at col. 3, ln. 7-13.

Regarding claim 16, Gardner at least suggests a surface area value within the claimed range- while Gardner's surface area value (50-300 $m^2/g$, with 100-200 $m^2/g$ being preferred) is measured with its Co in oxidized form, see id. at col. 5, ln. 23-29 and 48-50, Gardner does teach the reduction/activation of its Co prior to/during the use thereof in a reaction. See id. at col. 2, ln.

20-37. Given the foregoing, and the fact that Gardner shows no evidence or suggestion that its catalyst's surface area would be significantly decreased upon reduction/activation, Gardner at least suggests a surface area as claimed.

Regarding claim 18, Gardner at least suggests the appropriateness of employing ~5-20 wt. % Co within its catalyst, overlapping the claimed range and rendering the latter prima facie obvious. See id. at col. 3, ln. 7-9. In re Wertheim; MPEP § 2144.05.

6. Claims 1-5, 8, 9, 16 and 18 are alternatively rejected under 35 U.S.C. 103(a) as being unpatentable over Gardner in view of Leng et al., Pre-grant Pub. No. US 2006/0167119 (published 7-27-06; PCT filed 5-17-02) ("Leng"). Regarding claim 1, Gardner's teachings are as above. Should applicant argue that obtaining a particle size within the claimed range would not have been obvious at the time the invention was made in view of Gardner alone, this limitation is taught by Leng.

Leng teaches F-T catalysts such as $Co/Al_2O_3$ catalysts. See Leng at par. 35 and 36. Leng further teaches that particle sizes of 5-500 μm are appropriate therefor, with 5-100 μm being preferred and 5-40 μm being especially preferred. See id. at par. 42. Given the foregoing, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Gardner's catalyst by employing a particle size as taught by Leng, due to Leng's teaching of the appropriateness and preferability thereof.

Regarding claim 2, Gardner teaches a preferred surface area of 100-200 $m^2/g$, within the claimed range. See id. at col. 5, ln. 26-29.

Regarding claim 3, as above, it would have been obvious to one of ordinary skill in the art at the time the invention was made to ascertain and achieve an appropriate particle size, such

as within the claimed range, for Gardner's catalyst via routine experimentation. In re Aller; MPEP 2144.05.

Regarding claims 4 and 5, Gardner teaches a preferred pore size of ~100-300 Å, within the claimed ranges. See Gardner at col. 5, ln. 26-33.

Regarding claim 8, Gardner teaches the presence of a promoter material in both its fresh (see id. at col. 3, ln. 7-13) and reconditioned (see id. at col. 5, ln. 39-44) catalysts. A weight % as claimed is at least suggested thereby. See id. at col. 3, ln. 7-13 and col. 5, ln. 39-44. In re Wertheim; MPEP § 2144.05.

Regarding claim 9, Gardner at least suggests employing Re as a promoter. See id. at col. 3, ln. 17-21. It may reasonably be presumed that such a promoter would be appropriate within the weight % ranges taught by Gardner immediately prior to Re, within and/or overlapping the claimed range. See id. at col. 3, ln. 7-13.

Regarding claim 16, Gardner at least suggests a surface area value within the claimed range- while Gardner's surface area value (50-300 $m^2/g$, with 100-200 $m^2/g$ being preferred) is measured with its Co in oxidized form, see id. at col. 5, ln. 23-29 and 48-50, Gardner does teach the reduction/activation of its Co prior to/during the use thereof in a reaction. See id. at col. 2, ln. 20-37. Given the foregoing, and the fact that Gardner shows no evidence or suggestion that its catalyst's surface area would be significantly decreased upon reduction/activation, Gardner at least suggests a surface area as claimed.

Regarding claim 18, Gardner at least suggests the appropriateness of employing ~5-20 wt. % Co within its catalyst, overlapping the claimed range and rendering the latter prima facie obvious. See id. at col. 3, ln. 7-9. In re Wertheim; MPEP § 2144.05.

7. Claims 10-12 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gardner (taken alone or in view of Leng as necessary) (herein "G/GL") in view of Singleton et al., US 6,255,358 (2001). Regarding claim 1, G/GL's teachings are as above. Regarding claim 10, the difference between the claim and G/GL is that the latter fails to explicitly teach that its $Al_2O_3$ is $\gamma$-$Al_2O_3$. This limitation, however, is taught by Singleton.

Singleton teaches $Co/Al_2O_3$ catalysts for F-T reactions, stating that Co supported upon $\gamma$-$Al_2O_3$ are particularly effective in three-phase reactor processes. See Singleton at col. 4, ln. 8-25. Various catalyst characteristics taught by Singleton show its catalyst to be highly similar to G/GL's. See id. at col. 4, ln. 45-53. Given the similarity of G/GL's and Singleton's catalysts, and Singleton's teaching that specifically employing $\gamma$-$Al_2O_3$ affords an especially effective catalyst for F-T reactions, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify G/GL's catalyst composition by employing $\gamma$-$Al_2O_3$ as its $Al_2O_3$ source as taught by Singleton.

Regarding claims 11 and 12, Singleton teaches the doping of its $\gamma$-alumina supported Co catalysts with La to provide the support with increased thermal stability. See Singleton at col. 3, ln. 51-56, col. 4, ln. 8-25, 30, and 45-54, and col. 10, ln. 11-15. Singleton teaches that such La-doping of the alumina carrier not only increases the latter's thermal stability, but also increases the catalyst's activity for F-T syntheses without negatively affecting its selectivity therein. See id. at col. 10, ln. 11-15. Hence, it would also have been obvious to one of ordinary skill in the art at the time the invention was made to modify G/GL's catalyst composition by employing a La stabilizer as taught by Singleton, due to Singleton's taught advantage of the increased stability and activity afforded thereby.

Regarding claim 18, Singleton additionally teaches ~20-45 wt. % Co in its catalysts, with a 20 wt. % Co value specifically taught. See id. at col. 4, ln. 34-41 and col. 8, ln. 13-14. This range at least partially overlaps with Gardner's suggested "fresh" catalyst's metal content of ~5-20 wt. % (see Gardner at col. 3, ln. 7-9). Given the foregoing agreement between Gardner and Singleton regarding appropriate catalyst Co amounts, the obviousness of employing such an amount of Co within G/GL's catalyst is reinforced by Singleton.

8. Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over G/GL in view of Hansford, US 3,988,263 (1976). Regarding claim 1, G/GL's teachings are as above. Regarding claim 13, the difference between the claim and G/GL is that the latter fails to teach the inclusion of a binder in its alumina support. This limitation, however, is taught by Hansford.

Hansford teaches the production of calcined, alumina-supported cobalt catalysts, wherein the support contains a binder to improve the catalysts' pellet strength and thermal stability. See Hansford at col. 1, ln. 54-62, col. 2, ln. 64-67, and col. 3, ln. 59-66; Ex. 10. Given that Hansford and G/GL 's teachings similarly relate to the formation of alumina-supported cobalt catalysts, and G/GL's teaching that the inclusion of a binder within the support material yields improved catalyst structural and thermal stability, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify G/GL's supported catalyst by including a binder material therein as taught by Hansford, due to G/GL's taught motivation of improved catalyst stabilities as discussed above.

Regarding claims 14-15, Hansford teaches alumina hydrogels or hydrosols as its binder materials, said material(s) being present within Hansford's alumina support in amounts of 10-25 wt. %, rendering the claimed range prima facie obvious. In re Wertheim; MPEP § 2144.05.

**Response to Arguments**

9. Applicant's 10/13/10 arguments have been fully considered but they are not persuasive. Regarding applicant's arguments that Gardner's catalyst is not taught to be an F-T catalyst, applicant is reminded that a recitation of the claimed invention's intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, as Gardner's is, it meets the claim. See, e.g., Ex Parte Cordova, 10 USPQ2d 1949, 1950-51 (BPAI 1987). Notwithstanding the foregoing, applicant's statement that Gardner's catalyst is directed toward fixed bed applications, as opposed to applicant's intended (slurry-phase) F-T process, is undercut by Gardner's statement that its catalyst can also be employed in slurry-phase processes. See Gardner at col. 6, ln. 12-27. This applicability to slurry-phase procedures lends further support to the obviousness of adjusting Gardner's catalyst particle size as desired through routine experimentation, as discussed below.

Regarding applicant's statements that Gardner's catalyst is unsuitable as an F-T catalyst because i) its size is more suited to use in hydrotreating operations, ii) it is oxidized in Gardner's step (d), and is iii) pre-sulfided, these arguments are likewise unpersuasive, as detailed below.

Regarding i), change in size and shape is not patently distinct over the prior art absent persuasive evidence that the particular configuration of the claimed invention is significant. See In re Rose, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966). See also MPEP 2144.04 IVA. Moreover, since the F-T process is well-known in the art to be a slurry process, and it is likewise well-known that smaller particles are more uniformly slurried and

perform more effectively therein, adjusting the size of Gardner's particles to an appropriate size for any intended/desired use thereof through routine experimentation would have been obvious to one of ordinary skill in the art at the time the invention was made. In re Aller; MPEP 2144.05. Gardner's statement of its catalyst's applicability to slurry-phase processes lends further support to the foregoing conclusion of obviousness. See Gardner at col. 6, ln. 12-27.

Regarding ii), even in oxidized form, Gardner's catalyst would be reduced into F-T effective form upon exposure to F-T starting reagents (and known reducing agents) $H_2$ and CO.

Regarding iii), Gardner suggests that its spent catalyst is either oxidized or sulfided. See Gardner at col. 1, ln. 40-46. Given that Gardner removes all S from its catalyst during its regeneration process, see id. at, e.g., col. 2, ln. 3-11, no such F-T catalyst-poisoning S should remain. Further, as stated above, any catalyst oxidation would be removed upon exposure to $H_2$ and CO, reducing Gardner's catalyst and rendering it suitable for F-T usage.

10. It is noted that applicant declined to comment "on the suitability of combining or modifying the cited references." The combinability of the above references is hereby re-asserted as proper.

**Conclusion**

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the

advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL BERNS whose telephone number is (571)270-5839. The examiner can normally be reached on Monday thru Thursday, 9AM-6PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Emily Le can be reached at (571)272-0903. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. B./ December 15, 2010
Examiner, Art Unit 1734

/Emily M Le/
Supervisory Patent Examiner, Art Unit 1734